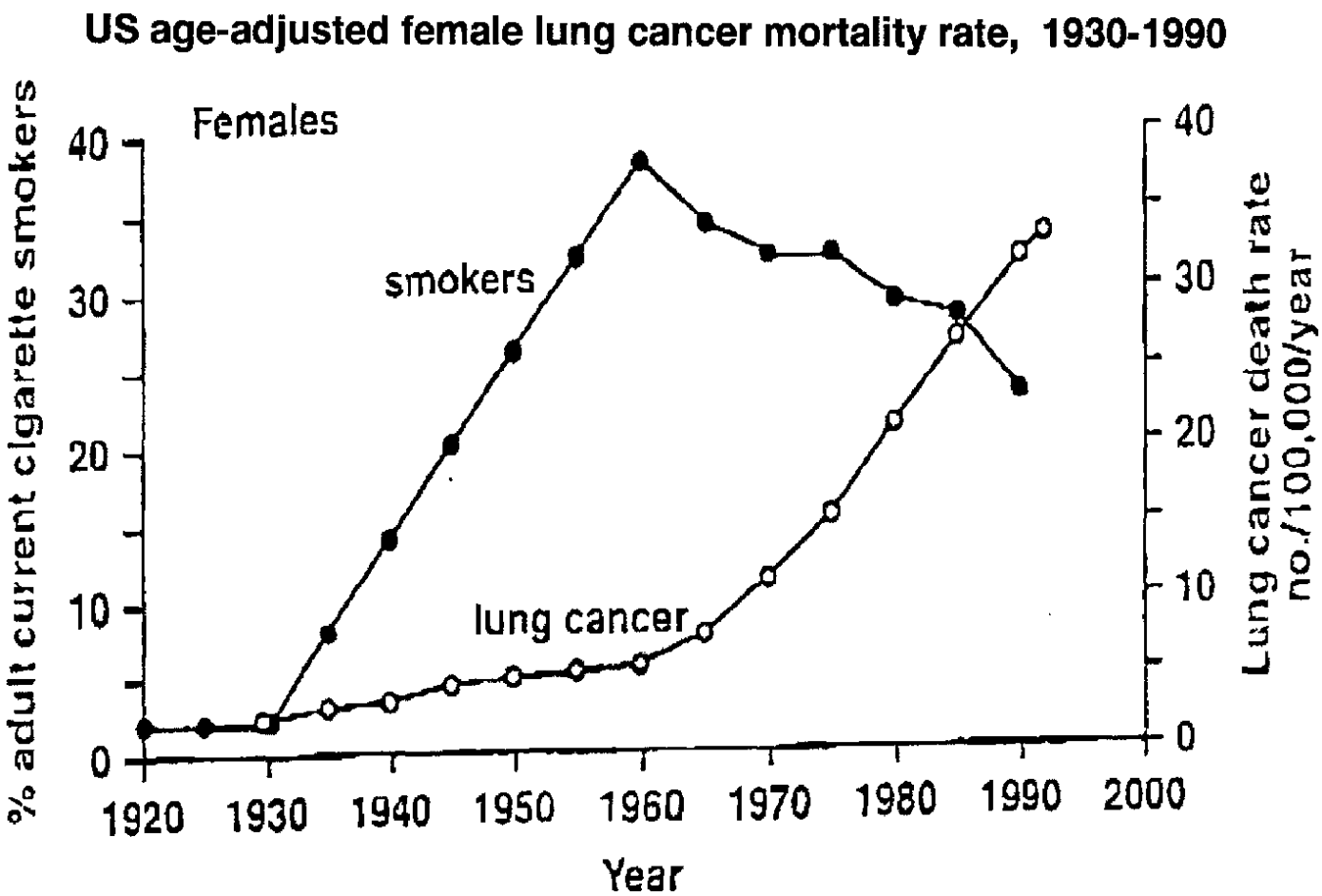
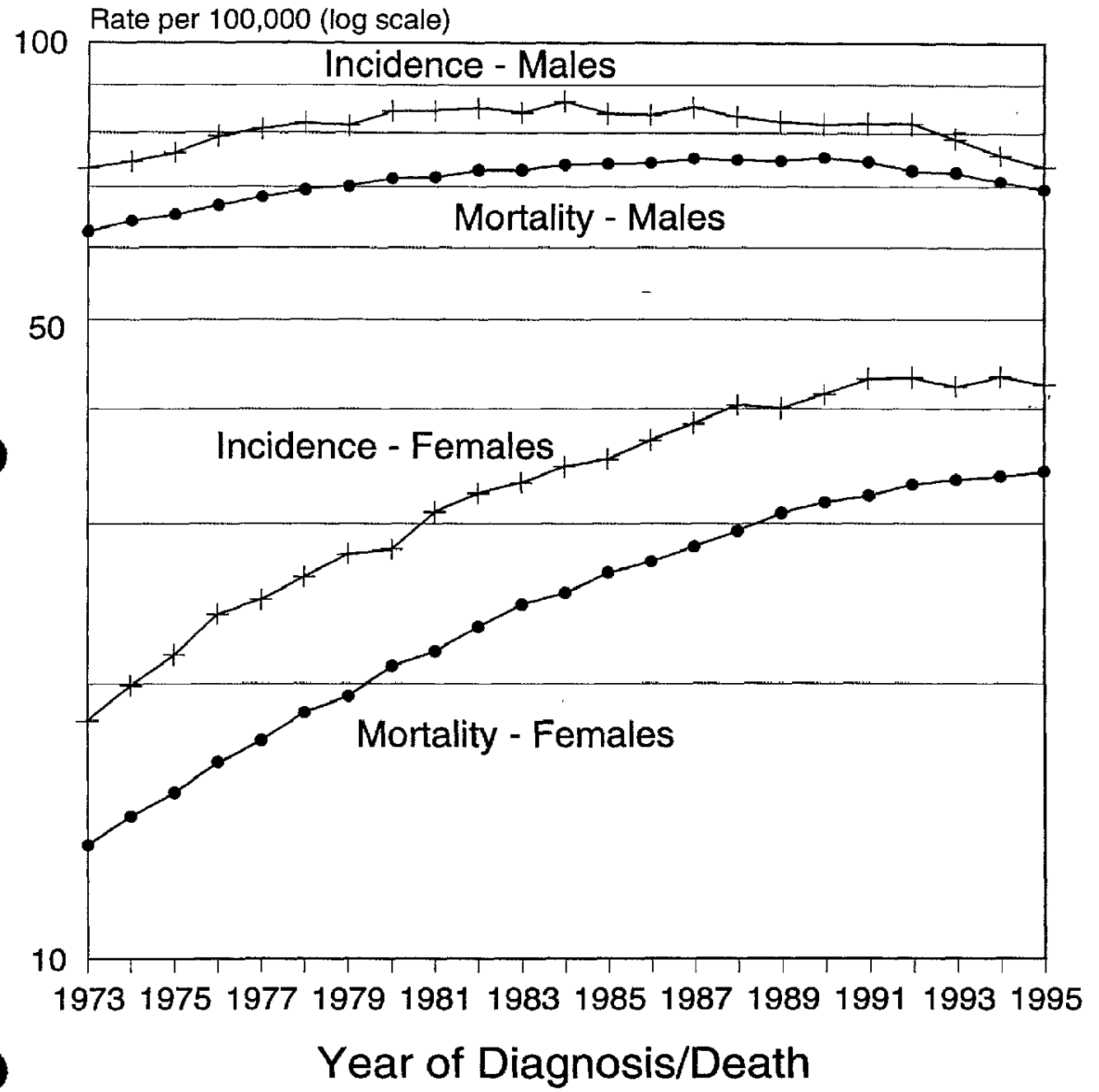
Trends in US lung cancer mortality



- (Fig. 2. From: Weiss, W., Cigarette Smoking and Lung Cancer Trends. A light at the end of the tunnel?, Chest, 111(5): 1414-1416, 1997.

Figure XV-5

Cancer of the Lung & Bronchus
SEER Incidence & U.S. Mortality Rates, 1973-1995
By Sex, All Races

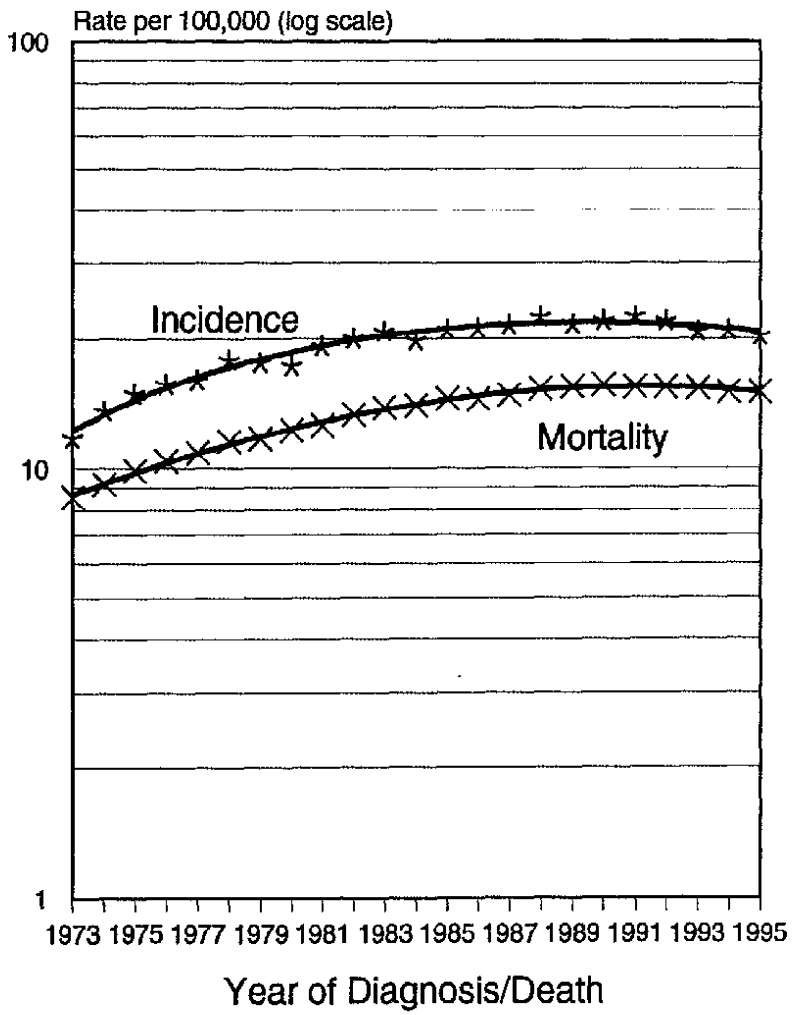


Age-adjusted to 1970 Standard

PM3001117076

SEER Incidence and U.S. Mortality
Lung, Female, Under 65 Years of Age
By Race

White



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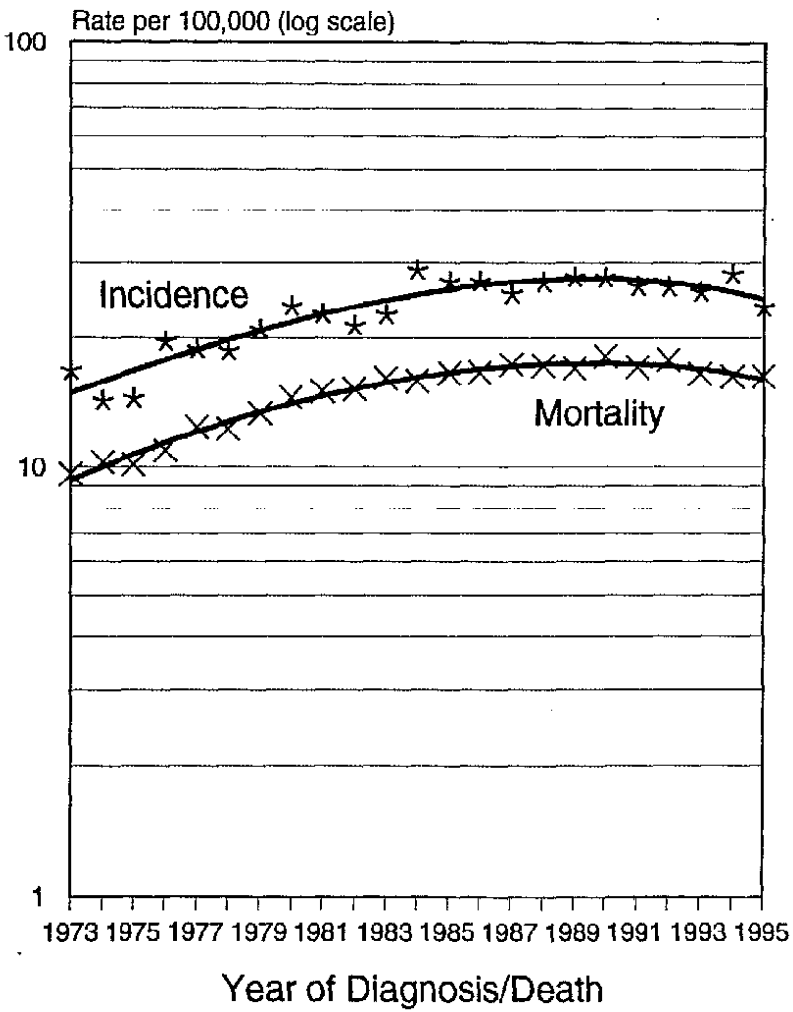

Figure XV-2

Histological Type ?

- Reports on changing trends in specific types of lung cancer
  - Compensatory smoking
  - Changes in smoke composition
- e.g., Stellman et al. 1997 and Levi et al. 1996
- However, specific data not available

Table 10 Risk of Lung Cancer by Histologic Type in Association with Dose and Duration of Tobacco Smoke Exposure

	Number of cigarettes smoked per day					
	0	1–10	11–20	21–30	31–40	40+
Males						
Kreyberg I[a] (n = 676)	1.0	13.3	15.8	29.6	37.7	64.1
Kreyberg II (n = 475)	1.0	2.4	8.4	15.4	11.1	28.4
Females						
Kreyberg I (n = 401)	1.0	6.6	18.2	26.5	95.2	88.7
Kreyberg II (n = 384)	1.0	3.1	4.5	9.4	13.8	20.7

	Years of smoking[c]			
	1–29	30–39	40–49	⩾50
Males				
Squamous (n = 3708)	1.0	2.3	3.3	4.0
Small-, oat cell (n = 1172)	1.0	1.8	2.2	2.4
Adenocarcinoma (n = 716)	1.0	1.5	1.8	1.5
Females				
Squamous (n = 272)	1.0	2.4	2.5	5.1
Small-, oat cell (n = 199)	1.0	2.1	1.6	4.7
Adenocarcinoma (n = 223)	1.0	2.0	1.8	3.3

		Years of smoking[d]		
Males	# cig/day	1–29	30–39	40+
Squamous/oat (n = 396)	1–19	2.3	2.9	5.0
	20–29	2.6	3.9	10.4
	30+	7.7	8.3	31.2
Adenocarcinoma (n = 163)	1–19	1.4[f]	2.2	2.6
	20–29	0.7[f]	1.5[f]	3.6
	30+	5.4	3.2	11.8

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EPIDEMIOLOGY OF LUNG CANCER

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Lung Cancer and Cigarette Smoking

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I. The Evolution of the Evidence on Tobacco Smoking and Lung Cancer

The causal relationship between smoking and lung cancer was clearly established in cohort and case-control studies reported in the 1950s and 1960s. Many of the studies conducted in the last two decades have further refined description of the relationship between tobacco smoking and lung cancer while reaffirming the causal nature of this association. Results from these studies show that differences in various aspects of smoking behavior affect lung cancer risk and can account for most observed differences in lung cancer rates among population groups. These newer studies considered such aspects of smoking behavior as age at starting to smoke, numbers of cigarettes smoked, types of cigarettes smoked, and inhalation pattern.

These studies also provide data on the risk of smoking as cigarettes have changed with the addition of filters and other modifications designed to reduce the amount of tar and nicotine delivered to the smoker. The results of the studies conducted during the 1970s and 1980s have clear public health implications as they have addressed these newer, purportedly lower-risk products.

Trends of histological types of lung cancer

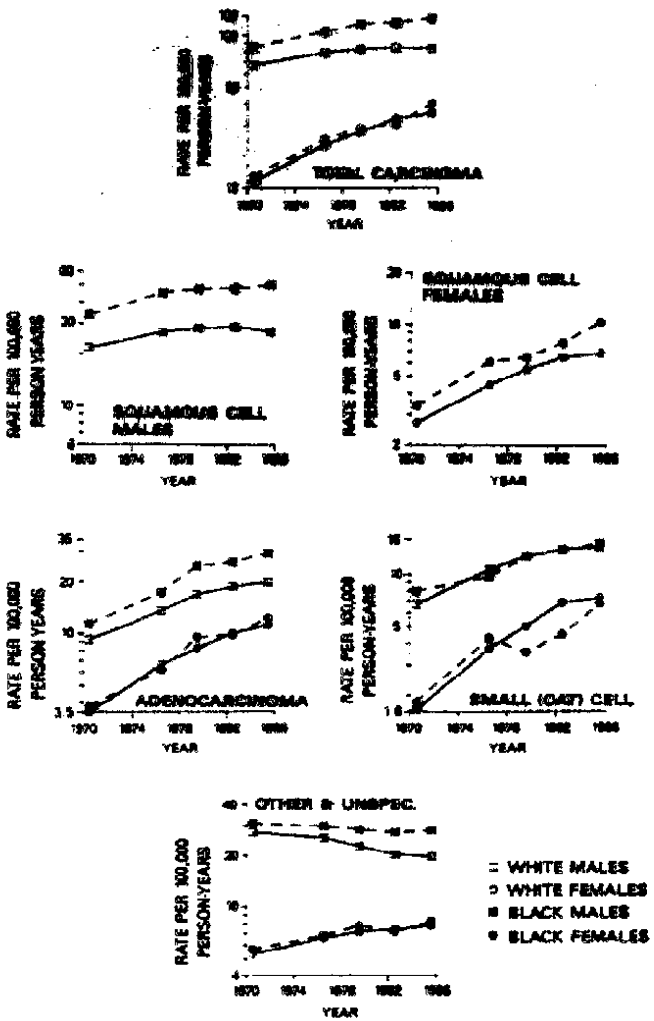
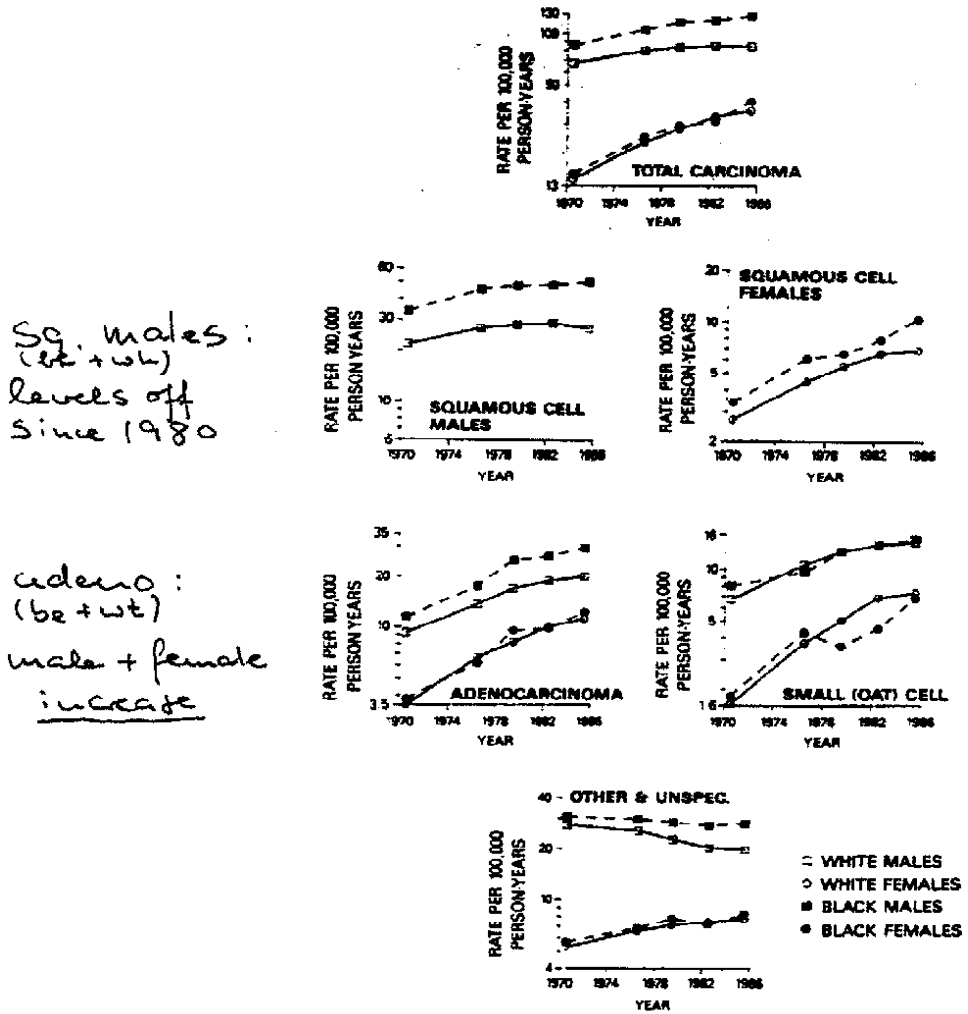


Fig. 1. Age-adjusted incidence trends in carcinoma of the lung in five geographic areas by histological type, race, and sex, 1969–71 to 1984–86.

Trends of histological types of lung cancer



Sq. males: (bl + wh) levels off since 1980

adeno: (bl + wh) male + female increase

Fig. 1. Age-adjusted incidence trends in carcinoma of the lung in five geographic areas by histological type, race, and sex, 1969–71 to 1984–86.

Examples of Potential Smoke Constituents or their Metabolites as Biomarkers of Exposure

Particulate Phase

- Nicotine Metabolites
  (More than just cotinine)
- 4-aminobiphenyl (adducts)
- benzo[a]pyrene (adducts)
- PAH (adducts to plasma albumin)
- TSNA related biomarkers
- solanesol
- metals

Gas/Vapor Phase

- carbon monoxide (COHb)
- cyanide (thiocyanate)
- acetonitrile
- aldehyde metabolites
- 2,5-dimethylfuran

NRC-based Guidelines

e.g.

- Unique or nearly unique for cigarette smoke
- Easily and accurately quantifiable in body fluid(s)
- Indicative for long-term exposure
- Fairly constant ratio to other cigarette smoke constituents

Benowitz, N.L., Biomarkers of environmental tobacco smoke exposure, Environmental Health Perspectives, 107(2): 349–355 (1999)

Test Population

- Sufficient number of participants to ensure statistical power
- Demographics representative
  - Geographic location
  - Ethnic composition
  - Age distribution
  - Gender distribution
- Collect information valuable to address relevant genetic polymorphisms

Exposure Analysis

- Number of cigarettes smoked/day
- FTC tar and nicotine rating of cigarettes smoked
- Diary/questionnaire information on how test population smokes
- Objective measure wherever possible

Sampling methodology

- Minimal impact on smoking patterns
- High level of subject compliance
- Accepted and validated analytical methodology
- Establishment of analytical and biological variation (inter-personal, intra-personal)
- Data analysis with predetermined methods and research hypotheses

CHART -filter tar ma share

RELATIONSHIP OF CIGARETTE FACTORS TO AGE ADJUSTED LUNG CANCER INCIDENCE